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Rod Diameter Does Not Influence Rod Fracture Rate after Surgical Treatment using Magnetically Controlled Growing Rods

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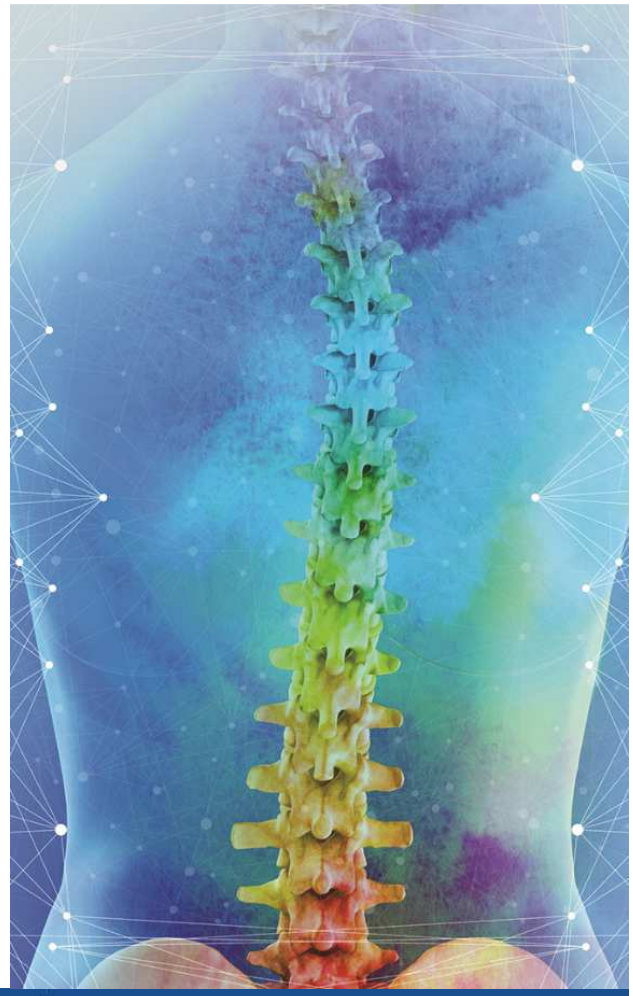
Disclosures

- Research Support
  - POSNA
  - OSRF
  - SRS



Introduction

- Device related complications persist in the face of evolving growth friendly constructs for EOS treatment
- Risk of fracture cited between 6% and 29%
- At the time of study, few risk factors for fracture of magnetically controlled growing rods (MCGR) identified
- Rate of rod fracture is important because it takes into account when the fracture occurred in treatment. Not all rod fractures are equal.

Purpose

- To investigate the association between rod diameter and rod fracture in patients with EOS undergoing treatment with MCGR

- **Hypothesis:** MCGR constructs with 4.5mm diameter have an increased rate of rod fracture compared to larger diameter rod constructs in use by patients with EOS

Study Design and Patients

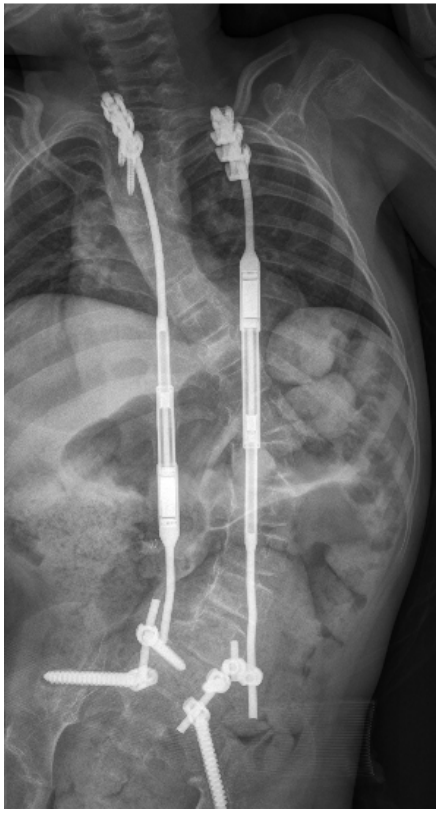
- **Retrospective Cohort Study**
  - Patients identified in a multicenter registry
    - Pediatric Spine Study Group Registry

- **Inclusion Criteria**
  - Diagnosis of Early Onset Scoliosis (EOS)
  - Primary or converted MCGR implant from 2013-2017

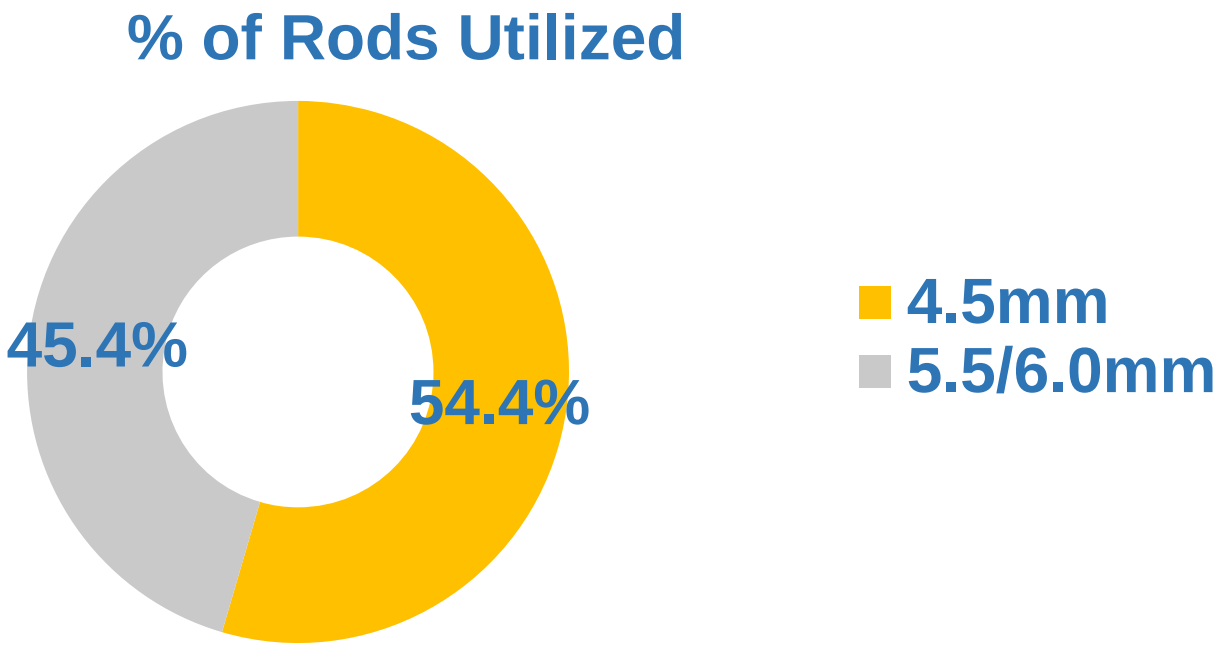
Study Intervention and Outcomes

- **Exposure:**
  - MCGR Diameter:
    - 4.5 diameter vs 5.5/6.0mm

- **Primary Outcome:**
  - Rod fracture determined by radiographs at each participating site and medical record confirmed by database audit



Study Participants – 1054 Rods in 527 patients



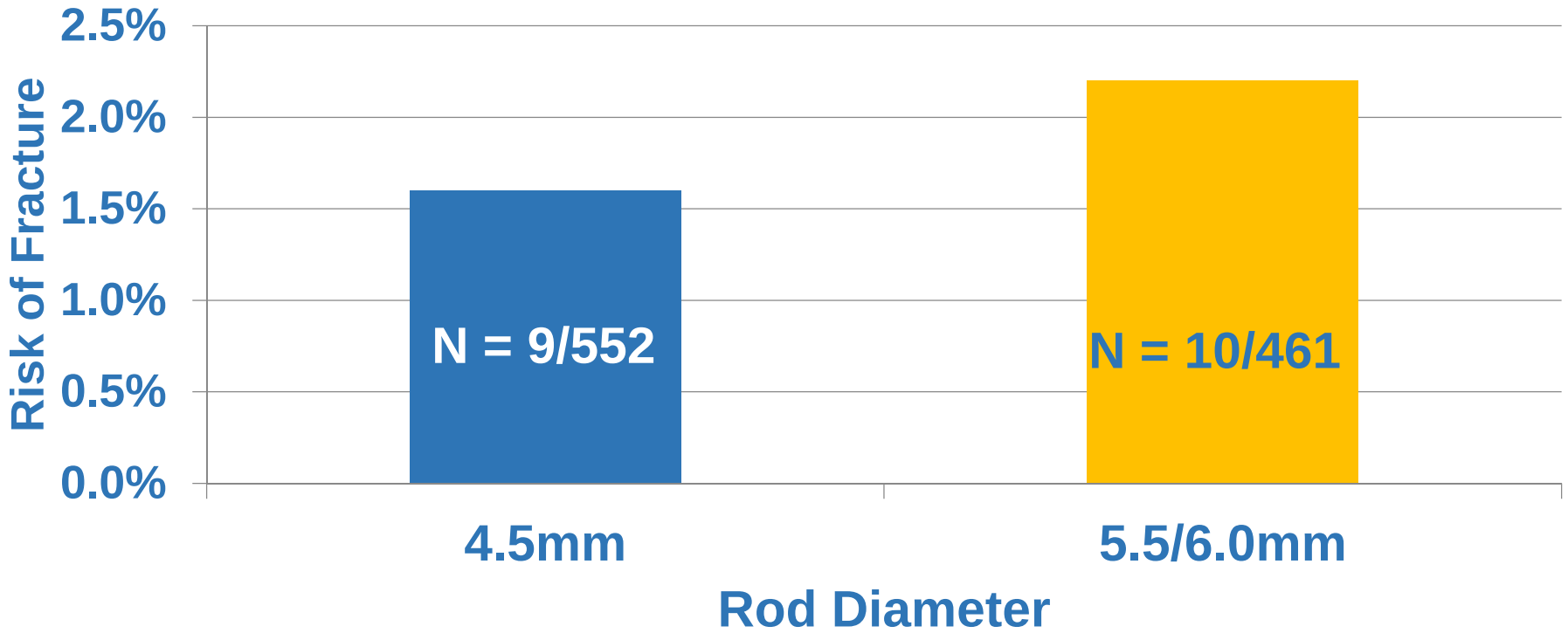
Baseline Comparison

		4.5 mm (N)	5.5 mm/6.0 mm (N)	p-value
Follow Up	Years	1.7 (522)	1.4 (441)	<0.001
Major Curve	Degrees	70 (516)	69 (397)	.273
Kyphosis	Degrees	53 (432)	50 (327)	.065
Age at Surgery	Years	7.0 (552)	8.9 (461)	<0.001
Gender	Male	45.1% (249)	47.1% (217)	0.532
	Female	54.9% (303)	52.9% (244)	
Patient Type	New	80.6% (445)	69.8% (322)	<0.001
	Conversion	19.4% (107)	30.2% (139)	
Weight	kg	20.1 (488)	26.0 (383)	<0.001
Halo Traction	Yes	13.0% (72)	3.5% (16)	<0.001
	No	87.0% (480)	96.5% (445)	

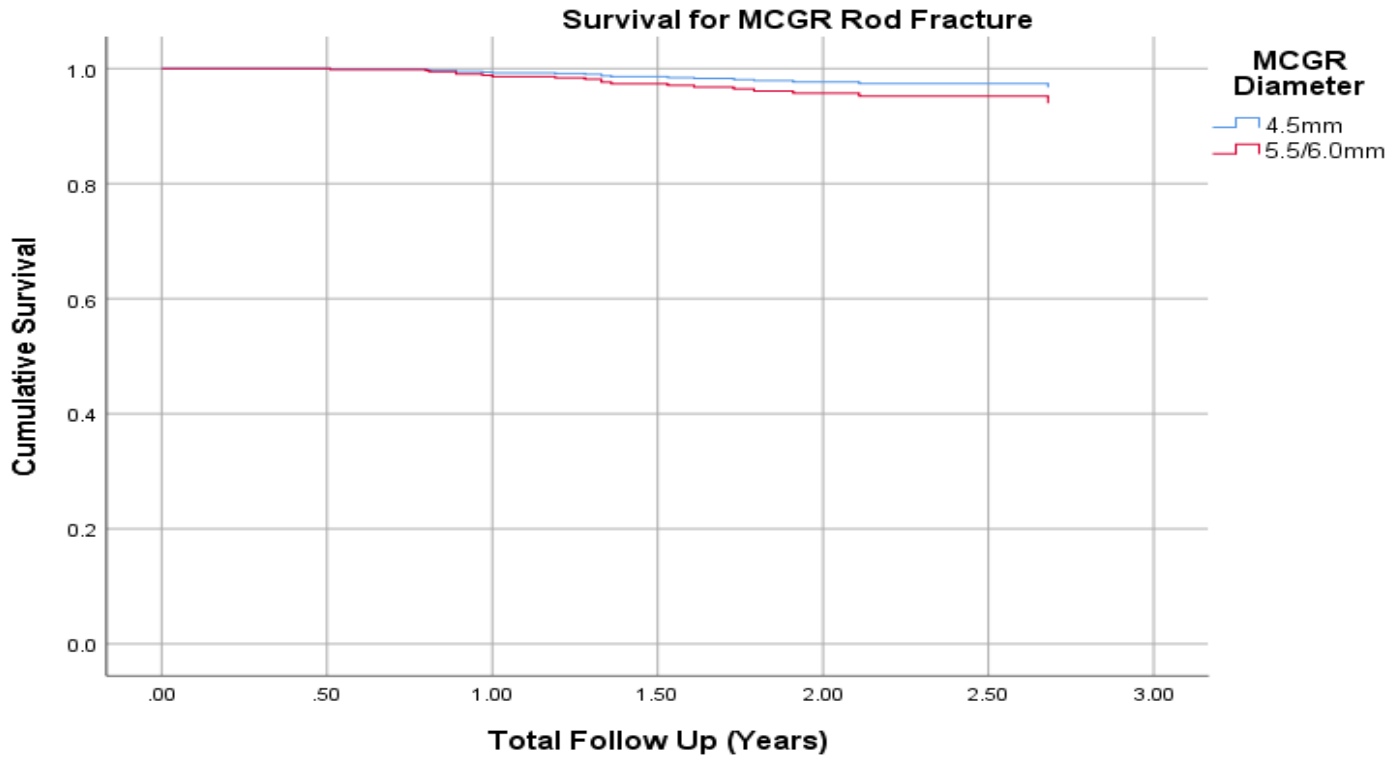
Overall Risk of Fracture

Total # of rod fractures = 19 / 1013 (1.9%)

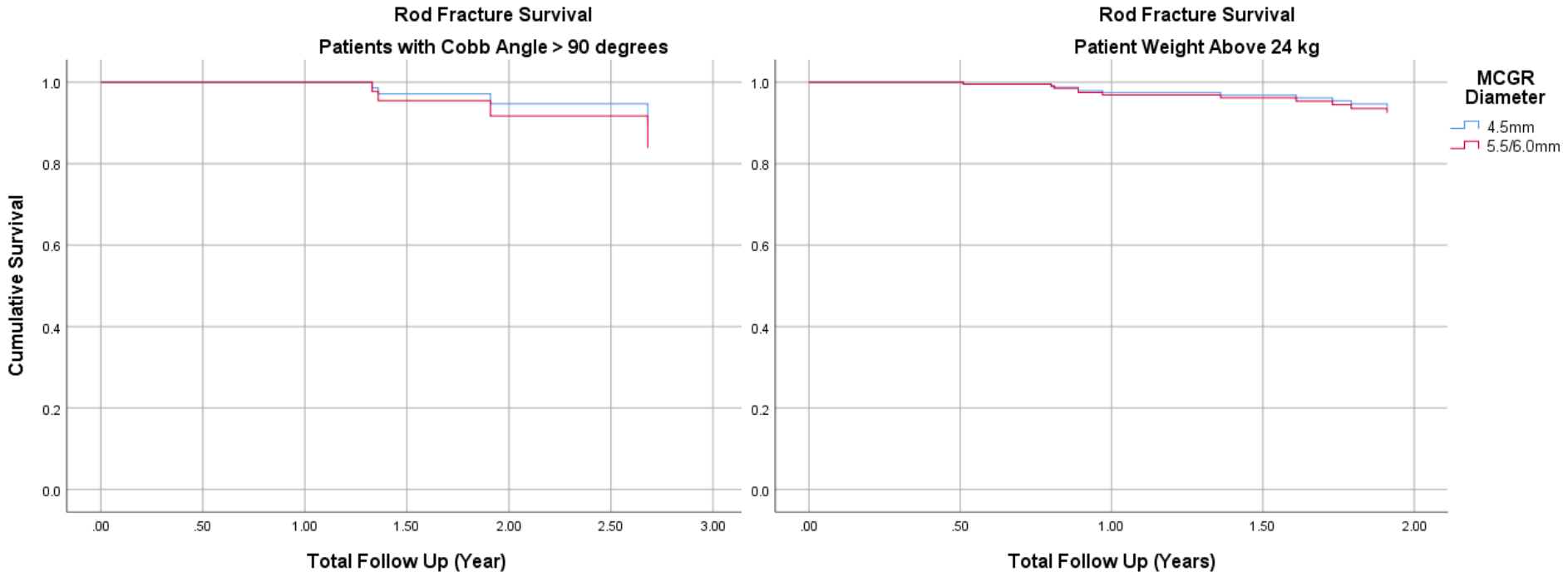
p = 0.529



No difference in rate of rod fracture between smaller and larger rod diameters using cox regression



No difference in rate of rod fracture at different weight thresholds and curve thresholds



Discussion

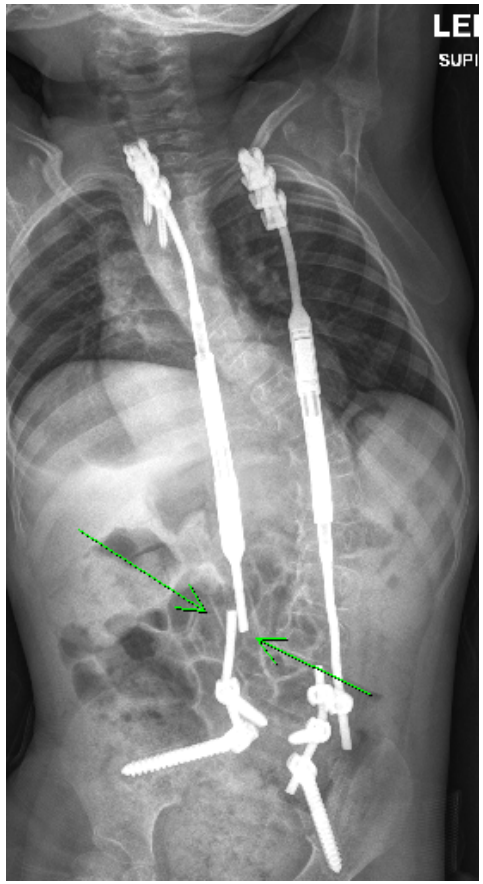
- Absolute number of rods fractures is low (20 total, 1.6% in 4.5mm rod and 2.2% in 5.5/6.0mm rods)
  - Probable that not all fractures have been reported
  - However, large dataset encompasses significant amount of MCGR in the US

- No difference in the rate of fracture between 4.5mm and 5.5/6.0mm rods
  - Even when stratify by age, weight/ BMI, curve magnitude…

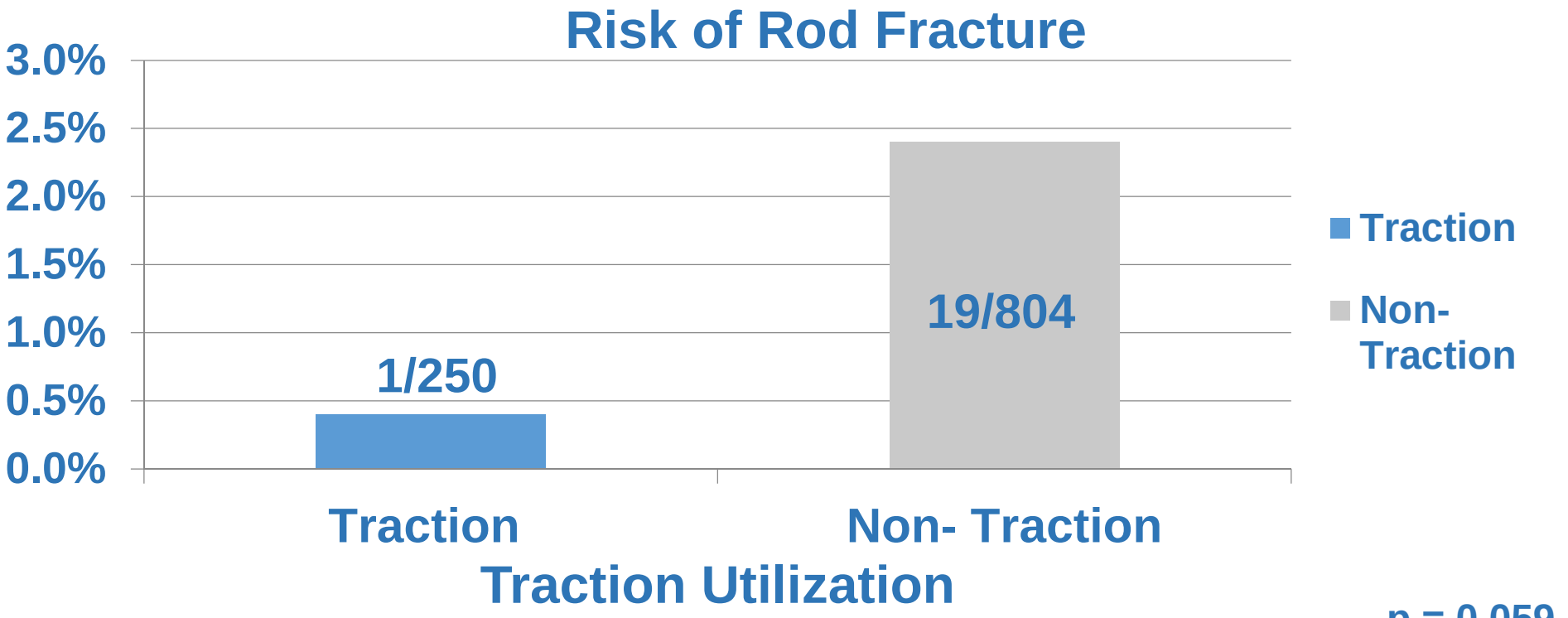
Discussion

- MCGR is relatively new in the US.
  - Still uncovering risk factors for complications like fracture

- Interesting unexpected finding that traction seems to have a protective effect



Any type of traction (intra-op or Halo) may have a protective effect



p = 0.059

Conclusion

- Data suggests that rod diameter does not have an effect on the RATE of rod fracture
  - Counterintuitive finding
- Continue to collect fractures and evaluate possible risk factors
- Further evaluate role of peri-operative traction as possible protective factor

Thank you!

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